

**Amendment and Response**

Applicant: Michael Bauer et al.

Serial No.: 10/598,143

Filed: August 18, 2006

Docket No.: I550.236.101/2003P54067WOUS

Title: SEMICONDUCTOR COMPONENT HAVING A STACK OF SEMICONDUCTOR CHIPS AND METHOD FOR PRODUCING THE SAME

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**REMARKS**

The following remarks are made in response to the Non-Final Office Action mailed April 27, 2011. Claims 1-23 have been cancelled. Claims 24-46 were rejected. With this Response, claim 27 has been amended. Claims 24-46 remain pending in the application and are presented for reconsideration and allowance.

**Drawing Objections**

The drawings were objected to as failing to comply with 37 CFR 1.84(p)(5) for not including certain reference numerals.

Applicants submit that, due to a clerical error, incorrect Figures 1-5, as originally filed, were inadvertently submitted as drawings for the present application. However, the present application claims priority to an earlier filed PCT Application, Publication No. WO 2005/081315, which includes the correct Figures 1-5 for the present application. Accordingly, with this Response, Figures 1-5 of WO 2005/081315 are being submitted as Replacement sheets for original Figures 1-5 and do not represent new matter.

**Claim Objections**

Claim 27 was objected to due to grammatical informalities.

With this Response, claim 27 has been amended to correct grammatical informalities. As such, Applicants respectfully request that the objection to claim 27 be withdrawn.

**Claim Rejections under 35 U.S.C. § 103**

Claims 24-27 and 45 were rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Publication No. 2003/0132527 to Coomer (“Coomer”) in view of US Patent No. 5,847,448 to Val et al. (“Val”).

Claims 28, 30, 32 and 42 were rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val and US Publication No. 2004/0026007 to Hubert et al. (“Hubert”).

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Claim 33 was rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, and US Publication No. 2002/0105789 to Chen et al. (“Chen”).

Claims 29 and 41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, and further in view of the NORLAND data sheet dated 2/1998 (“Norland”).

Claims 31 and 43 were rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, and further in view of “A Photocurable Poly(dimethylsiloxane) Chemistry Designed for Soft Lithographic Molding and Printing in the Nanometer Regime” by Choi et al. (“Choi”).

Claim 34 was rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, and US Publication No. 2002/0105789 to Chen et al. (“Chen”).

Claim 35 was rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, Chen, and further in view of US Patent Publication No. 2003/0038353 to Derderian (“Derderian”).

Claim 36 was rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, Chen, US Patent No. 5,637,536 to Val (“Val ‘536”), and US Patent No. 7,060,526 to Farnworth (“Farnworth”).

Claims 37-38 were rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, Chen, Val ‘536”, Farnwoth, and Choi.

Claims 39 and 44 were rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val, Hubert, Chen et al. (2002/0105789) in view of Val (5,637,536) and further in view of Farnworth (7,060,526) in view of Photocurable Chemistry and further in view of Nordal et al.

Claim 40 was rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val and Hubert.

Claim 46 was rejected under 35 U.S.C. 103(a) as being unpatentable over Coomer in view of Val.

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Applicants respectfully submit that neither Coomer nor Val, either alone or in combination, teach or suggest the semiconductor component defined by independent claim 1.

The Office Action, at page 4, concedes that Coomer fails to teach or suggest semiconductor chips comprising contact areas extending as far as the edges of the semiconductor chips, but asserts that such limitation is obvious in view of the teachings of Val. Applicants respectfully disagree.

Val, with reference to Figures 1-5, describes a device including semiconductor plates P, such as semiconductor chips, stacked between a first insulating plate  $F_V$  forming a front face and a second insulating plate  $F_R$  forming a rear face, with the stack having a face B, called a base, to be mounted on a printed circuit board CI. The front insulating face  $F_V$  includes “stack contacts”  $P_E$  for connecting the stack to circuits on printed circuit board CI. The Office Action equates the stack contacts  $P_E$  on front face insulating plate  $F_V$  of Val asserts that it would have been obvious to modify the chips of Coomer to move the terminuses of conductors 410, 420 to edge of the chips in view of the teachings of Val and thereby arrive at the semiconductor component defined by independent claim 1.

However, Applicants submit that Val provides no teaching or suggestion of semiconductor chips having contact areas extending to the edge sides thereof, as asserted by the Office Action. Instead, Val simply teaches conventional semiconductor chips “P” having conventional contact areas  $P_C$  disposed on a major surface thereof, wherein the contacts  $P_C$  are spaced away from the edge sides of the chip and require the extension of a wire “F” to connect the contacts  $P_C$  to a metallic layer “M” on a side or lateral face  $F_L$  of the stack arrangement (Figures 4-5; Col. 2, Lines 1-63). The so-called side contacts  $P_E$  of Val are simply disposed on insulating layers/plates (i.e.  $F_V$ ,  $F_R$ ) between which the semiconductor chips P employing conventional contacts  $P_C$  are sandwiched.

As described above, Val provides no teaching or suggestion as to positioning contact areas extending to the edges of a chip. The contacts  $P_E$  of Val are described as “stack contacts” intended for connecting the stack to other circuits on the printed circuit board CI (Col. 2, lines 19-25), whereas the terminus of conductors 410, 420 of Coomer are akin to contacts  $P_C$  of Val

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and are intended for internal connections within the components of the stack. Val itself does not modify semiconductor chips “P” so as to position contact areas  $P_C$  on the edges of chips P, but instead uses contacts  $P_E$  disposed on insulating plates  $F_V$ ,  $F_R$  which are separate from semiconductor chips P.

As such, Applicants respectfully submit that one of ordinary skill in the art, when examining Val, receives no teaching or suggestion to modify the arrangement of Coomer so as to move the terminuses of conductors 410, 420 to the edge sides of semiconductor devices 310. At best, the person of ordinary skill in the art would be taught by Val to sandwich the semiconductor devices 310 of Coomer between insulating plates to form a stack, connect conventional contact areas of semiconductor devices to contact areas on the insulating plates (e.g. contact areas  $P_E$  on insulating plates  $F_V$ ,  $F_R$  of Coomer), turn the stack 90-degrees relative to that shown in Figure 4B of Coomer, and connect the rotated stack to a substrate via the contact areas on the insulating plates.

Additionally, the Office Action states that one of ordinary skill in the art would incorporate the side contacts  $P_E$  of Val in the arrangement of Coomer in order to shorten the length of the conductors 410, 420. However, such a modification would, in fact, increase the length of the conductors as is clearly evident in the example of Figure 5 of Val. As such, Applicants submit that no such motivation for combining Coomer with Val is present.

In view of the above, Applicants respectfully submit that one of ordinary would not, and could not, combine the teachings of Coomer with those of Val so as to arrive at a semiconductor component including semiconductor chips having contact areas extending to the edges of the semiconductor chips, as defined by independent claim 24. As such, Applicants respectfully request that the rejection of independent claim 24 under 35 USC 103 over Coomer in view Val be withdrawn and that independent claim 24 be allowed.

Independent claim 46 includes limitations similar to those described above with respect to independent claim 24. As such, for at least the reasons described above with respect to the allowability of independent claim 24, Applicants respectfully request that the rejection of

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independent claim 46 under 35 USC 103 over Coomer in view of Val also be withdrawn and that independent claim 46 be allowed as well.

Independent claim 33 includes limitations similar to those described above with respect to independent claim 24. Hubert was cited only for its teachings with respect to the use of materials employing nanoparticles, and Chen for its teachings with respect to encapsulating a stack. As such, for at least the reasons described above with respect to the allowability of independent claim 24, Applicants respectfully request that the rejection of independent claim 33 under 35 USC 103 over Coomer in view of Val, Hubert, and Chen also be withdrawn and that independent claim 33 be allowed as well.

Independent claim 40 includes limitations similar to those described above with respect to independent claim 24. Hubert was cited only for its teachings with respect to the use of materials employing nanoparticles. As such, for at least the reasons described above with respect to the allowability of independent claim 24, Applicants respectfully request that the rejection of independent claim 40 under 35 USC 103 over Coomer in view of Val and Hubert also be withdrawn and that independent claim 40 be allowed as well.

Since claims 25-32 depend from and further define patentably distinct independent claim 24, claims 34-39 depend from and further define patentably distinct independent claim 33, and claims 41-45 depend from and further define patentably distinct independent claim 40, Applicants respectfully request that the rejections of dependent claims 25-32, 34-39, and 41-45 under 35 USC 103 also be withdrawn and that dependent claims 25-32, 34-39, and 41-45 be allowed as well.

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**CONCLUSION**

In view of the above, Applicant respectfully submits that pending claims 24-46 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 24-46 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

Please consider this a Petition for Extension of Time for a sufficient number of months to enter these papers, if appropriate. At any time during the pendency of this application, please charge any additional fees or credit overpayment to Deposit Account No. 500471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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